Abstract Submitted
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Non-uniform electric field diagnostics in an atmospheric pressure radio frequency helium plasma[1] LEI WANG, Department of Applied Physics, Ghent University, Belgium, GHEORGHE DINESCU, National Institute of Laser, Plasma and Radiation, Romania, CHRISTOPHE LEYS, ANTON NIKIFOROV, Department of Applied Physics, Ghent University, Belgium — Electric fields in the sheath region of an atmospheric pressure radio frequency (RF) helium plasma are studied through Stark polarization spectroscopy. Helium lines around 492 nm including the forbidden line and field-free line are observed and analyzed in order to investigate the Stark effect under electric field. A fitting method based on one field-free line and two forbidden line profiles is proposed to study the non-uniform electric field (high/ low field region) in the sheath. Time resolved electric field measurements are conducted for the sheath region at the grounded electrode. The high field region exhibits a peak and valley value around 33 kV/cm and 12kV/cm. The low field region is characterized by a maximum and minimum value about 10 kV/cm and 6 kV/cm. The electric field and emission intensity approximately follow the current waveform in RF cycles. This work intends to contribute to the insight of electric field dynamics in the sheath of atmospheric pressure RF plasmas.

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